BROOKHAVEN NATIONAL LABORATORY

Laboratory Link

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Building 130, P.O. Box 5000
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Phone: 631 344-5658 Fax: 631 344-3654
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New Tool Could Help Emergency Responders and Improve National Security

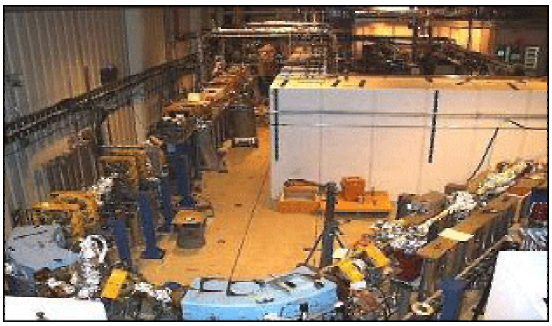
- A patent recently was awarded for a portable device that quickly detects and identifies unknown chemical and biological substances from safe distances. The sensor may be a very useful tool to help improve national security and could be readily used by emergency personnel or at sensitive locations, such as airports.
- The device, called a mini-Raman light detection and ranging (lidar) sensor, can analyze and identify many potentially harmful contaminants and pollutants, either as gases, solids, or liquids from approximately two to 50 meters away. Identification takes only minutes, and the sensor is small enough to be carried by emergency responders.

Too Much Food for Thought

- New research evidence shows that the brain circuits closely involved in drug addiction also are stimulated by the desire for food. The mere sight of food, smelling and tasting favorite foods without actually eating them, increases metabolism throughout the brain.
- Increases of metabolism in the right orbitofrontal cortex, a brain region that controls drive and pleasure, also strongly relates to self-reports of desire for food and hunger. These results could explain the harmful effects of constant exposure to food stimuli, such as advertising, candy machines, food channels on television, and displays in stores.

Laser Captures Molecules in a 'Flash'

- Many researchers have begun using the Lab's Deep Ultraviolet Free Electron Laser (DUV-FEL), located at the National Synchrotron Light Source, a facility generating infrared, ultraviolet, and x-ray light. With DUV-FEL's powerful ultraviolet laser light, they explored how gas molecules break apart when they are highly energized by the light, work that may offer insights into many fundamental chemical and physical processes, such as photosynthesis, radiation damage, and ozone formation.



Deep Ultraviolet Free Electron Laser

- Not only is the DUV-FEL is a very intense source of high-energy light pulses, it also has other unique properties. It is very steady and each pulse lasts less than one trillionth of a second. These short, intense "flashes" allow researchers to take very rapid 'snapshots' of brief molecular processes, such as chemical reactions.

(over)

Research Helps Convert Dredged Material into Cement

- Many Lab researchers cooperated in a project that developed a new technology for converting material dredged from the bottoms of harbors and waterways into a substance that can be made into construction-grade cement.
- The Gas Technology Institute (GTI) in Des Plaines, Illinois, developed the technology, called Cement-Lock, after many years of collaboration among Brookhaven Lab, the U.S. Environmental Protection Agency (EPA), the State of New Jersey, and other government and public groups.
- GTI is now carrying out a large-scale demonstration of the Cement-Lock process with a specially constructed 10-foot diameter by 30-foot long rotary kiln melter.

Photo courtesy of: Gas Technology Institute

The kiln in Bayonne, New Jersey

- Using this technology, contaminated material can be treated and its products used to our benefit instead of adding tons of material to landfills that already are short on space. These products might well offer economic incentives to restore and revitalize contaminated waterways, ports, and harbors around the entire world.

Summer School for Future Space Scientists Begins at the Lab

- As astronauts spend more time in space, scientists need to better understand the dangers space travelers face from exposure to radiation in deep space – and how to best shield them against these risks. A new NASA Summer Student Program at the Laboratory will help provide a "pipeline" of young researchers to tackle this challenge.
- This inaugural program will train 11 future space radiobiologists in an intensive three-week residential program at the Lab's NASA Space Radiation Laboratory (NSRL) and Medical Department. NSRL is a unique scientific facility that simulates the harsh radiation environment of outer space.
- Students participate in classroom activities and scientific experiments, working side-by-side with top space scientists from organizations such as NASA, Brookhaven Lab, Loma Linda University, Johns Hopkins University, Massachusetts General Hospital, and Columbia University. The courses emphasize experimental creativity and interdisciplinary approaches.